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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/026,469	12/27/2001	Charles A. Miller	2026.0030000	7774

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EXAMINER

DATSKOVSKIY, MICHAEL V

ART UNIT	PAPER NUMBER
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2835

DATE MAILED: 01/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/026,469

Applicant(s)

MILLER, CHARLES A.

Examiner

Michael V Datskovskiy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 5-8, 16, 17, 20, 21 and 23-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 17, 20, 21 and 24-26 is/are allowed.
- 6) ☐ Claim(s) 5-8, 16 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

1. Due to the newly discovered Prior Art the indicated allowable subject matter and the finality of the rejection of the last Office action are withdrawn.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

3. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 6 recites the limitation "said lithographic springs" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-8, 16, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tilton et al in view of Smith et al.

Tilton et al teach a cooling assembly comprising: an electronic package 10, Figs.1-4, having a cavity 19; a plurality of dies 11; a bottom substrate 26, wherein active electronic components face the bottom surface 26 and a coolant surrounding

interconnects 27 within the cavity 19; an inlet 22 and an outlet 23 coolant ports that allow the coolant to enter the cavity 19, wherein each die has at least one active surface associated with respective active electronic components, and when the coolant circulated in the cavity the coolant directly cools each active surface of each die 11. Tilton et al teach furthermore said cooling assembly comprising a coolant circulation system, Fig.4, coupled to said coolant ports 22, 23, wherein the coolant circulates within the package 10 and directly contacts all surfaces of each die 11 to directly cool active electronic components during their operation. Tilton et al do not teach said interconnects 27 being compliant and comprising lithographic springs. Smith et al teach an IC photo lithographically patterned spring contact, which along with being compliant also creates a gap between the active surface of the die and the substrate at it is a case in the device by Tilton et al. It would have been obvious to one skilled in the art at the time invention was made to employ an IC photo lithographically patterned spring interconnects as they taught by Smith et al in the device by Tilton et al in order to further decrease mechanical stress caused by thermal expansion of the components (to reduce thermal gradients on each active surface of each die).

Allowable Subject Matter

6. Claims 17, 20-21 and 24-26 are allowed.
7. The following is a statement of reasons for the indication of allowable subject matter: A combination of the structure claimed in claim 16, wherein said interconnects comprise first and second sets of compliant interconnects, the package further comprises a top substrate, and alignment posts attached to the bottom substrate

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(claim 17); The package further comprises a top substrate with a top surface representing an exterior surface of the package (claim 20); The package further comprises a top substrate, a bottom substrate and interconnection elements providing electrical path extending from the top substrate and the bottom substrate (claim 21); Said package comprising a cooling member and one or more heat radiators, wherein each die is immersed in the coolant and each heat radiator transfers heat from the coolant to said cooling member (claim 24); At least one non-contacting compliant interconnect coupled to a surface of said die, whereby heat can be further directed away from the surface of said die (claim 25); and The package further comprises a top substrate, a bottom substrate, wherein each die is flip-chip bounded to said top substrate (claim 26).

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Newton et al (US Patent 6,459,581); Patel et al (US Patent 6,550,263) and Mochizuki (Japan Patent JP403139899A).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Datskovskiy whose telephone number is 306-4535. The examiner can normally be reached on 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (703) 308-4815. The fax phone

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number for the organization where this application or proceeding is assigned is (703)
872-9306.

Any inquiry of a general nature or relating to the status of this application or
proceeding should be directed to the receptionist whose telephone number is (7030
306-3431.

Primary Patent Examiner

Michael Datskovsky

A handwritten signature in black ink, appearing to read "Michael Datskovsky", written in a cursive style.

January 20, 2004.